AD-A190 424 DEFENSE PURCHASES OF STRATEGIC MATERIALS: AN INTRODUCTION TO MDEIMS (DEFENSE ECONOMIC IMPACT MODELING SYSTEM)(U) OFFICE OF THE UNDER SECRETARY OF DEFENSE RESEARCH AND ENGINEE 1988 F/G 15/5 1/1

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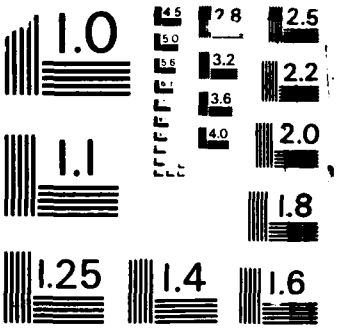

MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS - 1963 - A

DEFENSE PURCHASES OF STRATEGIC MATERIALS

AN INTRODUCTION TO MDEIMS

DEFENSE PURCHASES OF STRATEGIC MATERIALS

An Introduction to MDEIMS

DEPARTMENT OF DEFENSE CONTACTS

Principal Point of Contact:

Office of the Under Secretary of Defense for
Research and Engineering
Office of Industrial Base Assessment
Two Skyline Place, Suite 1406
5203 Leesburg Pike, Falls, Church, Virginia 22041

(202) 756-2310 (AV 289-2310)

Technical Questions about MDEIMS or DEIMS:

Economic Analysis Division
Office of the Director,
Program Analysis and Evaluation
Office of the Secretary of Defense
Pentagon, Room 2B284
Washington, D.C. 20301

(202) 697-2999 (AV 227-2999)

1. INTRODUCTION

The Department of Defense (DoD) has developed a model to project defense-related demands for each of 92 metals and basic materials.

The projections are made using a module of the Defense Economic Impact Modeling System (DEIMS). DEIMS itself is described in Defense Purchases: An Introduction to DEIMS, which is available from the DoD point of contact listed above. This booklet discusses only the materials module, referred to as MDEIMS. It walks through a sample MDEIMS projection, describes how the projections are made, and discusses sources of uncertainty in them.

The Appendix to the booklet is a listing (for each material in MDEIMS) of the sources of the underlying data. The appropriate data sources should be consulted before using MDEIMS projections, because the brief titles used in MDEIMS do not in all cases adequately describe what is included in the projections.

Attached at the end of this booklet is a listing of the materials included in MDEIMS and a form for ordering MDEIMS projections for particular materials. Along with the order form is a card designed to get your views on the projections and this booklet. Your comments will help us improve both the usefulness of the projections and the form in which they are presented.

2. SAMPLE MDEIMS PROJECTION

Table 1 presents, as an example, the MDEIMS projections of consumption of zircon. (Zircon is a silicate of zirconium). Zircon is a convenient example because the number of consuming industries is small. The form of the report is, however, the same for all of the materials included in MDEIMS.

Shown in the top half of the table is a breakdown by purchasing industry of what is labeled "defense-induced consumption." The figures shown are projected purchases of zircon used to produce products which are used in defense production. For example, it is estimated that in calendar 1984, products of iron and steel foundries used in defense applications will give rise to purchase of 3,800 short tons of zircon.

The lower half of the table shows projected consumption of zircon (again broken down by purchasing industry) in both defense and nondefense applications. Estimated consumption in nondefense applications (which is not shown separately) is the difference between total and defense-induced consumption.

Projections like those in Table 1 are issued annually and are based on the planned defense spending levels contained in the Defense Department's Five Year Defense Plan (FYDP), completed each January. (The DoD budget submitted to the Congress corresponds to the first year of the FYDP period.) Three other related points about the projections should be noted:

- The projections reflect planned DoD expenditures during each forecast year. (Expenditures generally differ from appropriations; appropriations usually are voted in a single year, but expended over several years.)

- The projections exclude pay costs (that is, salaries and annuities for military and civilian personnel) and the costs of items, such as fuel, bought by DoD abroad.

- The projections reflect DoD expenditures only; they do not include defense-related expenditures of other federal agencies.

The appendix to the booklet lists the data sources used (as described below) in making the MDEIMS projections. Definitions of consumption listed in these sources should be consulted before making use of the projections. This is important because there are often major differences among various statistical sources in how consumption is defined. For example, measured consumption can vary by more than one-third depending on whether products derived from scrap are included.

7/19/84

TABLE 1

DEFENSE ECONOMIC IMPACT MODELING SYSTEM
STRATEGIC MATERIAL REQUIREMENTS MODEL
FORECAST FOR:
ZIRCON
THOUSANDS OF SHORT TONS

INDUSTRY	1984	1985	1986	1987	1988	1989	AVG ANN %GROWTH 84 TO 89
DEFENSE INDUCED CONSUMPTION							
161. INORGANIC & ORGANIC CHEM	2.5	2.8	3.1	3.4	3.6	3.7	8.17
207. ABRASIVE PROD	0.9	1.0	1.1	1.3	1.3	1.4	8.42
211. NONCLAY REFRACTORIES	0.8	0.9	1.0	1.1	1.2	1.2	8.30
218. IRON & STEEL FOUNDRIES	3.8	4.3	4.6	4.9	5.0	5.1	6.00
230. NONFER ROLLING & DRAWING,NEC	0.5	0.5	0.6	0.7	0.7	0.7	9.96
TOTAL, ALL INDUSTRIES	8.6	9.6	10.5	11.3	11.8	12.2	7.36
TOTAL CONSUMPTION							
161. INORGANIC & ORGANIC CHEM	31.3	32.7	34.1	35.6	37.2	38.6	4.29
207. ABRASIVE PROD	16.8	17.1	17.8	18.6	19.4	20.0	3.51
211. NONCLAY REFRACTORIES	27.3	28.6	29.9	31.3	32.8	34.0	4.53
218. IRON & STEEL FOUNDRIES	59.3	62.4	63.7	65.1	66.8	68.0	2.75
230. NONFER ROLLING & DRAWING,NEC	3.3	3.6	3.8	4.1	4.3	4.6	6.48
TOTAL, ALL INDUSTRIES	138.1	144.4	149.3	154.7	160.6	165.2	3.65

3. HOW THE PROJECTIONS ARE MADE

The MDEIMS projections are based on DEIMS projections of the real dollar value of direct and indirect defense purchases from each of 400 Standard Industrial Classification (SIC) industries. This section describes how--given the projections of the dollar value of defense from various industries--the MDEIMS projections are computed.

Sample Computation

As is discussed below, the main difficulty in making projections of defense-related demands for materials lies in assembling the pertinent historical data. The MDEIMS computations themselves are straightforward. For a given material, the projections are formed simply by multiplying a "materials input coefficient" for an industry times the projected real dollar value of defense purchases from that industry. The "materials input coefficients" are historical ratios of consumption of a material (in physical units) to the real dollar value of domestic production of the industry in question.

Table 2 shows how projected defense-induced consumption of zircon in 1984 was computed. In column 1 are the DEIMS projections (in 1972 dollars) of defense purchases from each of the industries shown. The figure for projected defense purchases is the sum of "direct" and "indirect" defense purchases. "Direct" defense purchases are purchases made by DoD. "Indirect" defense purchases are goods pruchased as inputs to items bought by DoD; inputs to the inputs; and so on through the chain of production. As is explained in Defense Purchases, indirect defense purchases are estimated using an input/output model of the U.S. economy.

The second column of Table 2 shows the materials input coefficients used in computing projected zircon consumption. The coefficients are not for a single year, but averages over the years 1979 to 1981. In particular, the coefficient for each industry is the sum of estimated zircon consumption in that industry for the three years, divided by the real value of the industry's output over those years.

The final column of the table shows the product of the material input coefficients and projected real defense purchases from the industry. Projected defense-induced consumption of zircon in 1984--8,500 tons--is the sum of defense-induced consumption of the five industries that use significant amounts of zircon.

Computation of the Materials Input Coefficients

Computation of the materials input coefficients requires data on consumption of the materials covered in MDEIMS broken down by consuming SIC industries. For most of these materials, not all of the required data are

TABLE 2

COMPUTATION OF PROJECTED DEFENSE-INDUCED CONSUMPTION OF ZIRCON, 1984

Using Industry	Projected 1984 Defense Purchases from using Industry (billions of 1972 dollars)	Zircon Material Input Coefficient (Thousand tons per billion 1972 dollars)	Projected Defense-Induced Zircon Consumption (thousand tons)
Inorganic and Organic Chemicals	$1.583	1.60	2.5
Abrasive Products	0.065	14.09	0.9
Nonclay Refractories	0.013	64.54	0.8
Iron and Steel Foundries	0.319	11.99	3.8
Nonferrous Rolling and Drawing	0.120	3.90	0.5
Total	N/A	N/A	8.6

available on an annual basis. Data on total consumption in the U.S. are available on an annual (or shorter) interval, but published breakdowns of consumption data typically do not fully (if at all) correspond to SIC industries.

The breakdown used in MDEIMS is computed by the Department of Commerce for the Federal Emergency Management Agency. Consumption is recorded at the point that the material in question (e.g., zircon) is sold to a using industry (e.g., iron and steel foundries), not in terms of end products (e.g., machinery that has parts made with steel alloy forgings that contain zircon). For the materials covered, DOC uses consumption data reported annually by the Bureau of Mines of the Interior Department in Minerals Yearbook. In a few cases, import data are used to measure consumption. If, for the material in question, the data source reports consumption for one or more 4-digit SIC industries, those figures are used. In many cases, however, the breakdown of consumption by SIC industries must be estimated.

These points are illustrated--again, using zircon as an example--in Table 3. Shown on the left of this table are the five categories for which Minerals Yearbook reports zircon consumption. The first (zirconia and AZ abrasives) and last (other) correspond closely to 4-digit SIC industries, and the sum of two other categories (zircon refractories and AZS refractories) corresponds to another 4-digit SIC industry (nonclay refractories). In these cases, consumption reported in Minerals Yearbook is used. The remaining category (alloys), however, includes two 4-digit SIC industries--iron and steel foundries and nonferrous rolling and drawing. For this category, consumption reported in Minerals Yearbook must be broken down between the two 4-digit SIC industries.

The principal source used by DOC to make the required estimates is the most recent Census of Manufactures. Data in the Census of Manufactures permit the computation of the breakdown of materials consumption among 4-digit SIC industries. These data, however, are collected and reported only once every five years. In some cases, Minerals Yearbook or trade association publications report annual data that can be used in place of estimates computed using proportions from the Census of Manufactures. But in many cases the breakdowns of materials consumption by 4-digit SIC industry prepared by DOC are based on the proportions in the most recent Census of Manufactures.

Detailed questions about how the Department of Commerce consumption breakdowns are prepared should be referred to:

Mr. Robert Reiley
Director, Nonferrous Division
International Trade Administration
U.S. Department of Commerce
Telephone: 202-377-0575

Questions concerning the projections themselves should be referred to the point of contact listed at the front of this booklet.

TABLE 3

CORRESPONDENCE OF CATEGORIES OF ZIRCON CONSUMPTION REPORTED BY THE U.S. BUREAU OF MINES AND 4-DIGIT SIC INDUSTRIES

Bureau of Mines Category	4-Digit SIC Industries
Zirconia and AZ Abrasives	Abrasive Products
Zircon Refractories AZS Refractories	Nonclay Refractories
Alloys	Iron and Steel Foundries Nonferrous Rolling and Drawing
Other	Inorganic and Organic Chemicals

4. SOURCES OF UNCERTAINTY IN THE MDEIMS PROJECTIONS

Implicit in the preceding discussion are two broad sources of uncertainty in the MDEIMS projections. First, the MDEIMS projections use DEIMS projections of defense purchases, which in turn reflect levels of outlays in the Administration's planned defense budgets for the forecast horizons, not actual defense budgets enacted by the Congress. Second, the MDEIMS projections do not take account of changes in price, technological change, and changes in inventories, all of which can have significant effects on consumption of materials. Users should make such adjustments for these considerations as they feel appropriate.

Two more points should be borne in mind:

1. The MDEIMS projections assume that, for a given industry, the materials input coefficient for defense and nondefense production are the same.

2. In some cases, the material input coefficients used may be significantly influenced by defense programs which were cancelled some time after the data were collected. MDEIMS does not involve a program-by-program review of the defense budget and, hence, might overlook such changes.

It is also necessary to recognize that the MDEIMS projections for a given material may not be defined in a way that corresponds to industry practice. The underlying definitions should, then, be checked before the projections are used.

The MDEIMS projections reflect a large amount of data that are not readily available from other sources. They should, for this reason, be of use. But, as these comments suggest, the MDEIMS projections should not be accepted uncritically or used apart from related information.

Appendix

Primary Materials Data Sources and Definitions

Aluminum

Data Source: Consumption data are unavailable so shipment data are used instead. Information is provided by the Aluminum Association and the Bureau of the Census.

Scrap: Includes scrap.

Distribution: Based upon Aluminum Association, Census Bureau, and Bureau of Mines end-use data, and Commerce Department estimates.

Crude Aluminum Oxide, Crude Fused Silicon

Data Source: Assumes production, minus estimated Canadian share, plus U.S. imports equals U.S. consumption. Production data are obtained from the Minerals Yearbook, Abrasive Materials chapter, Table 17.

Scrap: Excludes scrap.

Distribution: Based upon end-use data in Minerals Yearbook.

Antimony, Bismuth

Data Source: Minerals Yearbook, Antimony chapter, Table 7, and Bismuth chapter, Table 2.

Scrap: Only antimony consumption includes scrap.

Distribution: Based upon Bureau of Mines end-use data, Commerce Department estimates and information obtained from industry sources.

Asbestos, Amosite and Chrysotile

Data Source: Mineral Yearbook, Asbestos chapter, Table 4.

Scrap: Includes scrap.

Distribution: Distribution to 4-digit SIC level is based upon Bureau of Mines end-use data and Commerce Department estimates.

Bauxite and Alumina

Data Source: Minerals Yearbook, Bauxite and Alumina chapter, Table 7 (Bauxite) and chapter text (Alumina).

Scrap: Excludes scrap.

Distribution: Based upon Bureau of Mines end-use data and Commerce Department estimates.

Cadmium

Data Source: No consumption data are available. Production is assumed to equal consumption. Data are obtained from the Minerals Yearbook, Cadmium chapter, Table 1.

Scrap: Includes scrap.

Distribution: Based upon analyst estimates, Bureau of Mines estimates, and data obtained from the Cadmium Council.

Cobalt

Data Source: Minerals Yearbook, Cobalt chapter, Table 3.

Scrap: Includes scrap.

Distribution: Based upon Bureau of Mines, Census Bureau end-use data, industry estimates, and Commerce Department judgments.

Chromium

Data Source: Minerals Yearbook, Chromium chapter, Table 6,

Scrap: Excludes scrap

Distribution: Bureau of Mines distribution augmented by Census Bureau end-use data and analyst's judgments.

Copper

Data Source: As reported in the Minerals Yearbook, Copper chapter, Table 30.

Scrap: Only scrap used to produce refined copper is included.

Distribution: Based upon Bureau of the Census Selected Materials Consumed, the Census Current Industrial Report MA33L, the Copper Development Association data, and analyst estimates.

Columbium and Tantalum, All Forms

Data Source: Minerals Yearbook Columbium and Tantalum chapter, Table 1 (Columbium concentrates), Table 2 (Tantalum minerals), Table 5 (Columbium metal), Table 6 (Ferro-columbium), and ITA estimates.

Scrap: Excludes scrap.

Distribution: Based upon Bureau of Mines consumption end-use data, as well as Commerce and industry estimates.

Diamond Bort and Stones, Industrial

Data Sources: International Trade Administration triannual Industrial Diamond Consumption Survey (ITA-992), and industry estimates.

Scrap: Only bort consumption includes reclaimed material.

Distribution: Based upon Commerce and industry estimates.

Diamond Dies, Under .0008"

Data Source: Assumes production plus imports equals consumption as reported in ITA's Diamond Die Survey (ITA-9015).

Scrap: Refinished dies, if any, are included.

Distribution: Based upon Commerce and industry estimates.

Fluorspar, Acid and Metallurgical Grades

Data Source: Minerals Yearbook, Fluorspar Chapter, Table 2 (in part).

Scrap: Includes scrap.

Distribution: Based upon analyst's estimates and Bureau of Mines data.

Germanium

Data Source: Consumption data are unavailable so apparent consumption is calculated using production and import data from Minerals Yearbook, Other Metals chapter.

Scrap: Includes scrap.

Distribution: Based upon Bureau of Mines and Commerce analyst's end-use estimates.

Graphite (Natural), Ceylon, Malagasy Crystalline, and Other

Data Source: Minerals Yearbook, Graphite chapter, Table 6 (in part), and Commerce and industry estimates.

Scrap: Scrap is not a factor.

Distribution: Based upon Bureau of Mines end-use data, industry and analyst's estimates.

Insulating Materials

Data Source: U.S. import data for feathers and down and U.S. Department of Agriculture data for poultry and duck feathers.

Distribution: Based on information from American Down Association and Department of Commerce analyst's estimates.

Iodine

Data Source: Minerals Yearbook, Other Minerals, Iodine, Table 1 (apparent consumption data).

Distribution: Bureau of Mines and Department of Commerce estimates.

Jewel Bearings

Data Source: Special industry survey.

Distribution: Special survey.

Lead

Data Source: Minerals Yearbook, Lead chapter, Table 13.

Scrap: Includes scrap.

Distribution: Based largely upon Bureau of Mines end-use data, and to a lesser extent on analyst and industry judgments.

Manganese

Data Source: Minerals Yearbook, Manganese chapter, Table 4.

Scrap: Excludes scrap.

Distribution: Based on Bureau of Mines end-use data, Census Bureau end-use data and analyst's judgments.

Mercury

Data Source: Minerals Yearbook, Mercury chapter, Table 6.

Scrap: Includes scrap.

Distribution: Based upon Bureau of Mines end-use data, industry and analyst's estimates.

Mica, all forms

Data Source: Assume production equals consumption, as reported in Bureau of Mines Minerals Yearbook, Mica chapter, Table 5.

Scrap: No ground mica, from scrap or flake mica, is included.

Distribution: Based upon Bureau of Mines end-use data.

Molybdenum

Data Source: Minerals Yearbook, Molybdenum chapter, Table 3.

Scrap: Includes scrap.

Distribution: Based upon Bureau of Mines end-use data and analyst's estimates.

Morphine

Data Source: Based on Drug Enforcement Administation records of opium imports.

Distribution: Entirely to pharmaceuticals and medical products.

Nickel and Vanadium, Ferro and Pentoxide

Data Source: Minerals Yearbook, Nickel chapter, Table 4 and Vanadium chapter, Table 5.

Scrap: Excludes scrap.

Distribution: Based upon Bureau of Mines end-use data, Census of Manufactures Shipments Report, industry estimates, and analyst's judgments.

Platinum, Palladium, Iridium

Data Source: Minerals Yearbook, Platinum-Group Metals chapter, Table 3.

Scrap: Includes scrap.

Distribution: Based upon Bureau of Mines end-use data, industry estimates, and analyst's judgments.

Pyrethrum

Data Source: U.S. import data

Distribution: Entirely utilized by chemical industry as a pesticide.

Quartz Crystal, Electronic Grade

Data Source: Minerals Yearbook, Other Nonmetals chapter, Table 4.

Scrap: Scrap is not a factor.

Distribution: Based upon Bureau of Mines end-use data.

Quinidine and Quinine

Data Source: U.S. import data.

Distribution: Department of Commerce industry analyst judgments, primarily used by pharmaceuticals industry.

Rhodium

Data Source: Minerals Yearbook, Platinum Group Metals chapter Table 3.

Scrap: Includes scrap

Distribution: Based on Bureau of Mines distribution and analyst's judgments.

Ricinoleic/Sebacic Acid

Data Source: U.S. import data (castor oil imports).

Distribution: Department of Commerce Analyst estimates based on information from the Castor Oil Association.

Rubber

Data Source: Bureau of Census import data for natural rubber consumption and Bureau of Census Rubber Supply and Distribution Report for synthetic rubber.

Scrap: Excludes reclaimed rubber

Distribution: Census of Manufactures end-use distribution, Rubber Manufactures Association, industry studies, various Bureau of Census reports and analyst's judgments.

Rutile

Data Source: Minerals Yearbook, Titanium chapter, Table 7.

Scrap: Excludes scrap.

Distribution: Based upon Bureau of Mines data, analyst's judgment, and industry estimates.

Sapphire and Rubies

Data Source: Special industry survey.

Distribution: Special industry survey.

Silver

Data Source: Minerals Yearbook, Silver chapter, Table 9.

Scrap: Includes scrap.

Distribution: Based upon Bureau of Mines end-use data, industry estimates, and analyst's judgments.

Talc, Block and Lump

Data Source: Commerce Department analyst and industry estimates.

Scrap: Excludes scrap.

Distribution: Based upon analyst and industry estimates.

Thorium Nitrate

Data Source: Bureau of Mines unpublished data

Distribution: Reported distribution in Minerals Yearbook, Thorium chapter and unpublished information from Bureau of Mines.

Titanium Sponge

Data Source: Minerals Yearbook, Titanium chapter, Tables 7 and 9, Department of Commerce and Titanium Survey (ITA-991).

Scrap: Includes scrap.

Distribution: Based upon Bureau of Mines end-use data, industry estimates, and analyst's judgments.

Tin

Data Source: Minerals Yearbook, Tin chapter, Table 7.

Scrap: Includes scrap.

Distribution: Based upon Bureau of Mines end-use data and analyst estimates.

Tungsten

Data Source: Minerals Yearbook, Tungsten chapter, Table 1 (Ores) and Table 6 (Powders and Ferro-tungsten).

Scrap: Includes scrap.

Distribution: Based upon Bureau of Mines end-use data and analyst's estimates.

Vegetable tannin

Data Source: U.S. import data.

Distribution: Department of Commerce analyst's estimates and industry sources.

Zinc

Data Source: Minerals Yearbook, Zinc chapter, Table 16.

Scrap: Includes scrap.

Distribution: Based upon data obtained from the Bureau of Mines, the American Iron and Steel Institute, the Zinc Institute, and analyst's estimates.

Zircon

Data Source: Minerals Yearbook, Zirconium and Hafnium chapter, Table 3.

Scrap: Includes Scrap

Distribution: Based on Bureau of Mines end-use distribution.

Zirconium

Data Source: Minerals Yearbook, Zirconium and Hafnium chapter, Table 4

Scrap: Includes scrap.

Distribution: Based on Bureau of Mines end-use distribution.

CODES FOR ORDERING MDEIMS PROJECTIONS

The following pages provide a list of 92 mineral products for which MDEIMS forecasts are available. Each forecast shows projected levels of defense demands and total demands by consuming industries over the forecast period. To order projections, simply complete the form attached at the end of this booklet. Be sure to include the order numbers for the projections you are requesting and whether or not you wish to be included on the MDEIMS mailing list (updates will be sent as available to companies or individuals listed there).

PRIMARY MATERIALS FOR WHICH MDEIMS FORECASTS ARE AVAILABLE
(Please Order by Numbers Listed at Left)

	PRIMARY MATERIAL	QUANTITY MEASURE
M1.	ALUMINA	THOUSANDS OF SHORT TONS
M2.	ALUMINUM	SHORT TONS
M3.	ALUMINUM OXIDE, FUSED CRUDE	SHORT TONS
M4.	ANTIMONY	SHORT TONS
M5.	ASBESTOS, AMOSITE	SHORT TONS
M6.	ASBESTOS, CRYSOTILE, GRADE 1619	METRIC TONS
M7.	ASBESTOS, CRYSOTILE, GRADE 1	METRIC TONS
M8.	ASBESTOS, CRYSOTILE, GRADE 2	METRIC TONS
M9.	ASBESTOS, CRYSOTILE, GRADE 3	METRIC TONS
M10.	ASBESTOS, CRYSOTILE, GRADE 4	METRIC TONS
M11.	ASBESTOS, CRYSOTILE, GRADE 5	METRIC TONS
M12.	ASBESTOS, CRYSOTILE, GRADE 6	METRIC TONS
M13.	ASBESTOS, CRYSOTILE, GRADE 7	METRIC TONS
M14.	BAUXITE METAL, JAMAICA AND SURINAN	THOUSANDS OF LONG DRY TONS
M15.	BAUXITE, REFRACTORY MATERIAL	THOUSANDS OF LONG DRY TONS
M16.	BERYL ORE (11% BEO)	SHORT TONS
M17.	BERYLLIUM COPPER MASTER ALLOY	SHORT TONS
M18.	BISMUTH	THOUSANDS OF POUNDS
M19.	CADMIUM	SHORT TONS
M20.	CHROMITE ORE, CHEMICAL GROSS WEIGHT	THOUSANDS OF SHORT TONS GROSS WEIGHT
M21.	CHROMITE ORE, METALLURGICAL GROSS WEIGHT	THOUSANDS OF SHORT TONS GROSS WEIGHT
M22.	CHROMITE ORE, REFRACTORY GROSS WEIGHT	THOUSANDS OF SHORT TONS GROSS WEIGHT
M23.	CHROMIUM FERRO, HIGH CARBON, GROSS WEIGHT	SHORT TONS
M24.	CHROMIUM, FERRO, LOW CARBON, GROSS WEIGHT	SHORT TONS GROSS WEIGHT
M25.	CHROMIUM, FERRO, SILICON, GROSS WEIGHT	SHORT TONS GROSS WEIGHT
M26.	CHROMIUM METAL	SHORT TONS
M27.	COBALT	THOUSANDS OF POUNDS
M28.	COLUMBIUM CONCENTRATE CB	THOUSANDS OF POUNDS
M29.	COPPER	THOUSANDS OF SHORT TONS
M30.	CORDAGE FIBERS, ABACA	MILLIONS OF POUNDS
M31.	CORDAGE FIBERS, SISAL	MILLIONS OF POUNDS
M32.	DIAMOND DIES, SMALL, NATURAL	PIECES
M33.	DIAMONDS, INDUSTRIAL BORT	THOUSANDS OF CARATS
M34.	DIAMONDS, INDUSTRIAL STONE	THOUSANDS OF CARATS
M35.	FLUORSPAR, ACID GRADE	THOUSANDS OF SHORT DRY TONS
M36.	FLUORSPAR, METALLURGICAL	THOUSANDS OF SHORT DRY TONS
M37.	GERMANIUM	KILOGRAMS
M38.	GRAPHITE, NATURAL, CEYLON	SHORT TONS
M39.	GRAPHITE, NATURAL, MALAGASY	SHORT TONS
M40.	GRAPHITE, OTHER	SHORT TONS
M41.	IODINE	THOUSANDS OF POUNDS
M42.	JEWEL BEARINGS	THOUSANDS OF PIECES
M43.	LEAD	THOUSANDS OF SHORT TONS
M44.	MANGANESE METAL, ELECTROLYTIC	SHORT DRY TONS
M45.	MANGANESE METAL, CHEMICAL	SHORT DRY TONS

M46.	MANGANESE ORE, METALLURGICAL	THOUSANDS OF SHORT DRY TONS
M47.	MANGANESE, BATTERY, NATURAL	SHORT DRY TONS
M48.	MANGANESE, BATTERY, SYNTHETIC, DIOXIDE	SHORT DRY TONS
M49.	MANGANESE, FERRO, HIGH CARBON	SHORT TONS
M50.	MANGANESE, FERRO, LOW & MED. CARBON	SHORT TONS
M51.	MANGANESE, FERRO, SILICON	SHORT TONS
M52.	MERCURY	FLASKS, 76 POUNDS PER FLASK
M53.	MICA, MUSCOVITE BLOCK	THOUSANDS OF POUNDS
M54.	MICA, MUSCOVITE BLOCK, GAGE GLASS	POUNDS
M55.	MICA, MUSCOVITE FILM, 1 AND 2 QUALITY	THOUSANDS OF POUNDS
M56.	MICA, MUSCOVITE SCRAP	THOUSANDS OF POUNDS
M57.	MICA, MUSCOVITE SPLITTINGS	THOUSANDS OF POUNDS
M58.	MICA, PHLOGOPITE BLOCK	POUNDS
M59.	MICA, PHLOGOPITE SCRAP	POUNDS
M60.	MICA, PHLOGOPITE SPLITTINGS	THOUSANDS OF POUNDS
M61.	MOLYBDENUM	THOUSANDS OF POUNDS CONTAINED MOLYB.
M62.	MORPHINE SULPHATE/ANALGESICS, CRUDE	AMA POUNDS
M63.	MORPHINE SULPHATE/ANALGESICS, REFINED	AMA POUNDS
M64.	NATURAL INSULATION FIBERS	THOUSANDS OF POUNDS
M65.	NICKEL (NI+CO)	SHORT TONS NI+CO
M66.	PLATINUM GROUP, IRIDIUM	THOUSANDS TROY OUNCES
M67.	PLATINUM GROUP, PALLADIUM	THOUSANDS TROY OUNCES
M68.	PLATINUM GROUP, PLATINUM	THOUSANDS TROY OUNCES
M69.	PYRETHRUM	POUNDS
M70.	QUARTZ CRYSTALS, NATURAL	THOUSANDS OF POUNDS
M71.	QUARTZ CRYSTALS, CULTURED	THOUSANDS OF POUNDS
M72.	QUINIDINE	THOUSANDS AV OUNCES
M73.	QUININE	THOUSANDS AV OUNCES
M74.	RHODIUM	THOUSANDS TROY OUNCES
M75.	RICINOLEIC/SEBACIC ACID PRODUCTS	THOUSANDS OF POUNDS
M76.	RUBBER	METRIC TONS
M77.	RUTILE	SHORT TONS
M78.	SAPPHIRE AND RUBY	THOUSANDS OF CARATS
M79.	SILICON CARBIDE, CRUDE	SHORT TONS
M80.	SILVER	THOUSANDS TROY OUNCES
M81.	TALC, STEATITE BLOCK AND LUMP	SHORT TONS
M82.	TANTALUM CONCENTRATES	THOUSANDS OF POUNDS
M83.	THORIUM NITRATE	SHORT TONS
M84.	TIN	METRIC TONS
M85.	TITANIUM SPONGE	SHORT TONS
M86.	TUNGSTEN	THOUSANDS POUNDS CONTAINED TUNGSTEN
M87.	VANADIUM	SHORT TONS CONTAINED VANADIUM
M88.	VEGETABLE TANNIN, CHESTNUT	LONG TONS
M89.	VEGETABLE TANNIN, QUEBRACHO	LONG TONS
M90.	VEGETABLE TANNIN, WATTLE	LONG TONS
M91.	ZINC	THOUSANDS OF SHORT TONS
M92.	ZIRCON	THOUSANDS OF SHORT TONS

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PLEASE INCLUDE MY NAME ON YOUR MAILING LIST _____

SEND REPLIES TO:

OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR
RESEARCH AND ENGINEERING

OFFICE OF INDUSTRIAL BASE ASSESSMENT
5203 LEESBURG PIKE, SUITE 1406,
FALLS CHURCH, VA 22041

OR YOU MAY TELEPHONE

(202) 756-2310 (AV 289-2310)

FEEDBACK FORM FOR MDEIMS

1. Did this booklet provide the material you needed to interpret the projections in which you were interested? If not, what were the most important items missing?

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2. Did the projections for your primary material seem reasonable?

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3. Are there other published forecasts to which MDEIMS projections can be readily compared?

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4. What part of MDEIMS was of the most use (M) or least use (L) to your company?

_____ Detailed projections by consuming industry of primary metals and materials used to meet defense requirements?

_____ Detailed projections by consuming industry of primary metals and materials used to meet total U.S. requirements?

_____ Total demand by metal or material for defense and total (no industry detail)?

5. Can you provide any insights helpful in determining differences in consumption patterns between defense use of primary materials by industry as compared to non-defense use of these same materials?

_____
_____
_____
_____
_____

6. Any other comments on MDEIMS--methodology, content, usefulness to your company, etc?

_____
_____
_____
_____
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OPTIONAL

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RETURN TO:

ECONOMIC ANALYSIS DIVISION
OFFICE OF THE DIRECTOR,
PROGRAM ANALYSIS & EVALUATION
OFFICE OF THE SECRETARY OF DEFENSE
THE PENTAGON, RM 2B-284,
WASHINGTON, D.C. 20301

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